D 16

```
FFFFFFFFFFFFFFFF         111               111            AAAAAAAAA
FFFFFFFFFFFFFFFF         111               111            AAAAAAAAA
FFFFFFFFFFFFFFFF         111               111            AAAAAAAAA
FFF                   111111            111111         AAA         AAA
FFF                   111111            111111         AAA         AAA
FFF                   111111            111111         AAA         AAA
FFF                      111               111         AAA         AAA
FFF                      111               111         AAA         AAA
FFF                      111               111         AAA         AAA
FFFFFFFFFFFFF            111               111         AAA         AAA
FFFFFFFFFFFFF            111               111         AAA         AAA
FFFFFFFFFFFFF            111               111         AAA         AAA
FFF                      111               111         AAAAAAAAAAAAAAA
FFF                      111               111         AAAAAAAAAAAAAAA
FFF                      111               111         AAAAAAAAAAAAAAA
FFF                      111               111         AAA         AAA
FFF                      111               111         AAA         AAA
FFF                      111               111         AAA         AAA
FFF                   111111111         111111111      AAA         AAA
FFF                   111111111         111111111      AAA         AAA
FFF                   111111111         111111111      AAA         AAA
```

```
**FILE**ID**EXTHDR                                   I 9

EEEEEEEEEE  XX      XX  TTTTTTTTTT  HH      HH  DDDDDDDD    RRRRRRRR
EEEEEEEEEE  XX      XX  TTTTTTTTTT  HH      HH  DDDDDDDD    RRRRRRRR
EE          XX      XX      TT      HH      HH  DD      DD  RR      RR
EE          XX      XX      TT      HH      HH  DD      DD  RR      RR
EE            XX  XX        TT      HH      HH  DD      DD  RR      RR
EE            XX  XX        TT      HH      HH  DD      DD  RR      RR
EEEEEEEE        XX          TT      HHHHHHHHHH  DD      DD  RRRRRRRR
EEEEEEEE        XX          TT      HHHHHHHHHH  DD      DD  RRRRRRRR
EE            XX  XX        TT      HH      HH  DD      DD  RR  RR
EE            XX  XX        TT      HH      HH  DD      DD  RR  RR
EE          XX      XX      TT      HH      HH  DD      DD  RR    RR        ....
EE          XX      XX      TT      HH      HH  DD      DD  RR    RR        ....
EEEEEEEEEE  XX      XX      TT      HH      HH  DDDDDDDD    RR      RR      ....
EEEEEEEEEE  XX      XX      TT      HH      HH  DDDDDDDD    RR      RR      ....

LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

```
0 MODULE EXTHDR (
0                 LANGUAGE (BLISS32),
0                 IDENT = 'V04-000'
0                 ) =
1 BEGIN
1
1 !
1 !****************************************************************************
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1 !*                                                                          *
1 !*                                                                          *
1 !****************************************************************************
1
1 !++
1 !
1 ! FACILITY:  F11ACP Structure Level 1
1 !
1 ! ABSTRACT:
1 !
1 !       This routine creates an extension file header for the given file
1 !       header.
1 !
1 ! ENVIRONMENT:
1 !
1 !       STARLET operating system, including privileged system services
1 !       and internal exec routines.
1 !
1 !--
1
1 !
1 ! AUTHOR:  Andrew C. Goldstein,  CREATION DATE:  27-Jul-1977  10:15
1 !
1 ! MODIFIED BY:
1 !
1 !       V02-001 LMP0005         L. Mark Pilant,         29-Dec-1981 15:00
1 !               Add support for Cathedral windows.
1 !
1 !       A0100   ACG0001         Andrew C. Goldstein,  10-Oct-1978  20:01
1 !               Previous revision history moved to F11A.REV
1 !
```

```
;     58          0058  1 !**
;     59          0059  1
;     60          0060  1
;     61          0061  1 LIBRARY 'SYS$LIBRARY:LIB.L32';
;     62          0062  1 REQUIRE 'SRC$:FCPDEF.B32';
```

```
1 GLOBAL ROUTINE EXTEND_HEADER (OLD_HEADER, FCB) =
1
1 !++
1 !
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine creates an extension file header for the given file
1 !       header.
1 !
1 !
1 ! CALLING SEQUENCE:
1 !       EXTEND_HEADER (ARG1, ARG2)
1 !
1 ! INPUT PARAMETERS:
1 !       ARG1: address of present last file header
1 !       ARG2: address of present last FCB or 0
1 !
1 ! IMPLICIT INPUTS:
1 !       CURRENT_WINDOW: address of file window or 0
1 !       PRIMARY_FCB: primary FCB of file
1 !       CURRENT_VCB: address of VCB of volume
1 !
1 ! OUTPUT PARAMETERS:
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !       NONE
1 !
1 ! ROUTINE VALUE:
1 !       address of new file header
1 !
1 ! SIDE EFFECTS:
1 !       file header created, window turned, FCB created
1 !
1 !--
1
2 BEGIN
2
2 MAP
2       OLD_HEADER      : REF BBLOCK,   ! file header arg
2       FCB             : REF BBLOCK;   ! FCB arg
2
2 LOCAL
2       OLD_FID         : BBLOCK [FID$C_LENGTH], ! file ID of old header
2       EXT_FID         : BBLOCK [FID$C_LENGTH], ! file ID of new header
2       VBN,                            ! index file VBN of new header
2       LBN,                            ! LBN of new header
2       MAP_AREA        : REF BBLOCK,   ! file header map area
2       NEW_HEADER      : REF BBLOCK;   ! address of new file header
2
2 EXTERNAL
2       CLEANUP_FLAGS   : BITVECTOR,    ! cleanup action flags
2       USER_STATUS     : VECTOR,       ! I/O status block for user
2       PRIMARY_FCB     : REF BBLOCK,   ! primary FCB of file
2       CURRENT_WINDOW  : REF BBLOCK,   ! window of file
2       CURRENT_VCB     : REF BBLOCK,   ! VCB of volume
2       HEADER_LBN,                     ! LBN of current file header
```

```
2               NEW_FID;                                ! file number of new extension header
2
2       EXTERNAL ROUTINE
2               INIT_FCB,                               ! initialize FCB
2               TURN_WINDOW,                            ! update window
2               CHECKSUM,                               ! checksum file header
2               MARK_DIRTY,                             ! mark header for writeback
2               CREATE_HEADER,                          ! create a new file ID and header
2               INVALIDATE,                             ! discard a block buffer
2               RESET_LBN,                              ! reassign buffer LBN
2               WRITE_HEADER,                           ! write file header
2               READ_HEADER,                            ! read file header
2               MAKE_EXTFCB;                            ! create an extension FCB
2
2
2       ! Save the file ID of the current last header. If the file is accessed, fix
2       ! up the FCB if it is not the primary and turn the window to include blocks
2       ! from the header if possible. Then prepare the old header for write-back.
2       !
2
2       OLD_FID[FID$W_NUM] = .OLD_HEADER[FH1$W_FID_NUM];
2       OLD_FID[FID$W_SEQ] = .OLD_HEADER[FH1$W_FID_SEQ];
2       OLD_FID[FID$W_RVN] = 0;
2
2       IF .FCB NEQ 0 AND .FCB NEQ .PRIMARY_FCB
2       THEN KERNEL_CALL (INIT_FCB, .FCB, .OLD_HEADER);
2
2       IF .CURRENT_WINDOW NEQ 0
2       THEN IF NOT .CURRENT_WINDOW[WCB$V_CATHEDRAL]
2       THEN KERNEL_CALL (TURN_WINDOW, .CURRENT_WINDOW, .OLD_HEADER, .PRIMARY_FCB[FCB$L_FILESIZE], .FCB[FCB$L_STVBN]
2
2       CHECKSUM (.OLD_HEADER);
2
2       ! Now create the new file ID. Map and read the corresponding block in the
2       ! index file to extract the file sequence number; then punt the buffer.
2       !
2
2       NEW_HEADER = CREATE_HEADER ();
2       EXT_FID[FID$W_NUM] = .NEW_HEADER[FH1$W_FID_NUM];
2       EXT_FID[FID$W_SEQ] = .NEW_HEADER[FH1$W_FID_SEQ];
2       LBN = .HEADER_LBN;
2       INVALIDATE (.NEW_HEADER);
2
2       ! Get back the old file header, which may or may not have been written out
2       ! due to buffer pool thrashing. Check the segment number for overflow.
2       ! Plug in the header extension linkage and write it.
2       !
2
2       NEW_HEADER = READ_HEADER (OLD_FID, .FCB);
2       MAP_AREA = .NEW_HEADER + .NEW_HEADER[FH1$B_MPOFFSET]*2;
2       IF .MAP_AREA[FM1$B_EX_SEGNUM] GEQU 255
2       THEN ERR_EXIT (SS$_HEADERFULL);
2       MAP_AREA[FM1$W_EX_FILNUM] = .EXT_FID[FID$W_NUM];
2       MAP_AREA[FM1$W_EX_FILSEQ] = .EXT_FID[FID$W_SEQ];
2
2       CHECKSUM (.NEW_HEADER);
2       WRITE_HEADER ();
```

```
;  178       0491  2 NEW_FID = 0;                                  ! header extension is complete
;  179       0492  2
;  180       0493  2 ! We now build the new file header over the old one in the same buffer, thus
;  181       0494  2 ! keeping the attributes.
;  182       0495  2 !
;  183       0496  2
;  184       0497  2 RESET_LBN (.NEW_HEADER, .LBN);
;  185       0498  2 MARK_DIRTY (.NEW_HEADER);
;  186       0499  2 HEADER_LBN = .LBN;
;  187       0500  2
;  188       0501  2 NEW_HEADER[FH1$W_FID_NUM] = .EXT_FID[FID$W_NUM];
;  189       0502  2 NEW_HEADER[FH1$W_FID_SEQ] = .EXT_FID[FID$W_SEQ];
;  190       0503  2
;  191       0504  2 MAP_AREA[FM1$B_EX_SEGNUM] = .MAP_AREA[FM1$B_EX_SEGNUM] + 1;
;  192       0505  2 MAP_AREA[FM1$W_EX_FILNUM] = 0;
;  193       0506  2 MAP_AREA[FM1$W_EX_FILSEQ] = 0;
;  194       0507  2 MAP_AREA[FM1$B_INUSE] = 0;
;  195       0508  2
;  196       0509  2 CH$FILL (0, .MAP_AREA[FM1$B_AVAIL]*2, .MAP_AREA+FM1$C_POINTERS);
;  197       0510  2
;  198       0511  2 ! Finally create an extension FCB if the file is accessed.
;  199       0512  2 !
;  200       0513  2
;  201       0514  2 IF .FCB NEQ 0
;  202       0515  2 THEN KERNEL_CALL (MAKE_EXTFCB, .NEW_HEADER, .FCB, 2);
;  203       0516  2
;  204       0517  2 RETURN (.NEW_HEADER);
;  205       0518  2
;  206       0519  1 END;                                          ! end of routine EXTEND_HEADER


                                                          .TITLE  EXTHDR
                                                          .IDENT  \V04-000\

                                                          .EXTRN  CLEANUP_FLAGS, USER_STATUS
                                                          .EXTRN  PRIMARY_FCB, CURRENT_WINDOW
                                                          .EXTRN  CURRENT_VCB, HEADER_LBN
                                                          .EXTRN  NEW_FID, INIT_FCB
                                                          .EXTRN  TURN_WINDOW, CHECKSUM
                                                          .EXTRN  MARK_DIRTY, CREATE_HEADER
                                                          .EXTRN  INVALIDATE, RESET_LBN
                                                          .EXTRN  WRITE_HEADER, READ_HEADER
                                                          .EXTRN  MAKE_EXTFCB, SYS$CMKRNL

                                                          .PSECT  $CODE$,NOWRT,2

                                   00FC 00000             .ENTRY  EXTEND_HEADER, Save R2,R3,R4,R5,R6,R7        ; 0377
               57 00000000G   9F   9E 00002               MOVAB   @#SYS$CMKRNL, R7                             ;
               5E             10   C2 00009               SUBL2   #16, SP                                      ;
               52        04   AC   7D 0000C               MOVQ    OLD_HEADER, R2                               ; 0454
     08   AE             02   A2   D0 00010               MOVL    2(R2), OLD_FID                               ;
                         0C   AE   B4 00015               CLRW    OLD_FID+4                                    ; 0456
                              53   D5 00018               TSTL    R3                                           ; 0458
                              16   13 0001A               BEQL    1$                                           ;
  0000G   CF                  53   D1 0001C               CMPL    R3, PRIMARY_FCB                              ;
                              0F   13 00021               BEQL    1$                                           ;
                              52   DD 00023               PUSHL   R2                                           ; 0459
```

```
                                  53 DD 00025        PUSHL   R3                              ;
                                  02 DD 00027        PUSHL   #2                              ;
                                  5E DD 00029        PUSHL   SP                              ;
                          0000G   CF 9F 0002B        PUSHAB  INIT_FCB                        ;
                     67           05 FB 0002F        CALLS   #5, SYS$CMKRNL                  ;
                     51   0000G   CF D0 00032  1$:   MOVL    CURRENT_WINDOW, R1              ; 0461
                                  1D 13 00037        BEQL    2$                              ;
        18      0B   A1           06 E0 00039        BBS     #6, 11(R1), 2$                  ; 0462
                             2C   A3 DD 0003E        PUSHL   44(R3)                          ; 0463
                     50   0000G   CF D0 00041        MOVL    PRIMARY_FCB, R0                 ;
                             38   A0 DD 00046        PUSHL   56(R0)                          ;
                                  06 BB 00049        PUSHR   #^M<R1,R2>                      ;
                                  04 DD 0004B        PUSHL   #4                              ;
                                  5E DD 0004D        PUSHL   SP                              ;
                          0000G   CF 9F 0004F        PUSHAB  TURN_WINDOW                     ;
                     67           07 FB 00053        CALLS   #7, SYS$CMKRNL                  ;
                                  52 DD 00056  2$:   PUSHL   R2                              ; 0465
             0000G   CF           01 FB 00058        CALLS   #1, CHECKSUM                    ;
             0000G   CF           00 FB 0005D        CALLS   #0, CREATE_HEADER               ; 0471
                     56           50 D0 00062        MOVL    R0, NEW_HEADER                  ;
                     6E      02   A6 D0 00065        MOVL    2(NEW_HEADER), EXT_FID          ; 0472
                     54   0000G   CF D0 00069        MOVL    HEADER_LBN, LBN                 ; 0474
                                  56 DD 0006E        PUSHL   NEW_HEADER                      ; 0475
             0000G   CF           01 FB 00070        CALLS   #1, INVALIDATE                  ;
                                  53 DD 00075        PUSHL   R3                              ; 0482
                             0C   AE 9F 00077        PUSHAB  OLD_FID                         ;
             0000G   CF           02 FB 0007A        CALLS   #2, READ_HEADER                 ;
                     56           50 D0 0007F        MOVL    R0, NEW_HEADER                  ;
                     50      01   A6 9A 00082        MOVZBL  1(NEW_HEADER), R0               ; 0483
                     52         6640 3E 00086        MOVAW   (NEW_HEADER)[R0], MAP_AREA      ;
                FF   8F           62 91 0008A        CMPB    (MAP_AREA), #255                ; 0484
                                  05 1F 0008E        BLSSU   3$                              ;
                           08C8   8F BF 00090        CHMU    #2248                           ; 0485
                                     04 00094        RET                                     ;
                02   A2           6E D0 00095  3$:   MOVL    EXT_FID, 2(MAP_AREA)            ; 0486
                                  56 DD 00099        PUSHL   NEW_HEADER                      ; 0489
             0000G   CF           01 FB 0009B        CALLS   #1, CHECKSUM                    ;
             0000G   CF           00 FB 000A0        CALLS   #0, WRITE_HEADER                ; 0490
                          0000G   CF D4 000A5        CLRL    NEW_FID                         ; 0491
                                  54 DD 000A9        PUSHL   LBN                             ; 0497
                                  56 DD 000AB        PUSHL   NEW_HEADER                      ;
             0000G   CF           02 FB 000AD        CALLS   #2, RESET_LBN                   ;
                                  56 DD 000B2        PUSHL   NEW_HEADER                      ; 0498
             0000G   CF           01 FB 000B4        CALLS   #1, MARK_DIRTY                  ;
             0000G   CF           54 D0 000B9        MOVL    LBN, HEADER_LBN                 ; 0499
                02   A6           6E D0 000BE        MOVL    EXT_FID, 2(NEW_HEADER)          ; 0501
                                  62 96 000C2        INCB    (MAP_AREA)                      ; 0504
                             02   A2 D4 000C4        CLRL    2(MAP_AREA)                     ; 0505
                             08   A2 94 000C7        CLRB    8(MAP_AREA)                     ; 0507
                     50      09   A2 9A 000CA        MOVZBL  9(MAP_AREA), R0                 ; 0509
                     50           02 C4 000CE        MULL2   #2, R0                          ;
50      00           6E           00 2C 000D1        MOVC5   #0, (SP), #0, R0, 10(MAP_AREA)  ;
                             0A   A2    000D6                                                ;
                             08   AC D5 000D8        TSTL    FCB                             ; 0514
                                  12 13 000DB        BEQL    4$                              ;
                                  02 DD 000DD        PUSHL   #2                              ; 0515
                             08   AC DD 000DF        PUSHL   FCB                             ;
```

```
                                      56  DD 000E2          PUSHL   NEW_HEADER                            ;
                                      03  DD 000E4          PUSHL   #3                                    ;
                                      5E  DD 000E6          PUSHL   SP                                    ;
                             0000G    CF  9F 000E8          PUSHAB  MAKE_EXTFCB                           ;
                      67              06  FB 000EC          CALLS   #6, SYS$CMKRNL                        ;
                      50              56  D0 000EF  4$:     MOVL    NEW_HEADER, R0                        ; 0517
                                          04 000F2          RET                                           ; 0519

; Routine Size:  243 bytes,    Routine Base:  $CODE$ + 0000


;  207          0520  1
;  208          0521  1 END
;  209          0522  0 ELUDOM




;                            PSECT SUMMARY
;
;       Name                     Bytes                      Attributes
;
;   $CODE$                              243  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)



;                        Library Statistics
;
;                                                 -------- Symbols --------         Pages        Processing
;       File                                      Total    Loaded   Percent         Mapped       Time
;
;  _$255$DUA28:[SYSLIB]LIB.L32;1                  18619        18         0         1000          00:01.9




;                             COMMAND QUALIFIERS

;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/LIS=LIS$:EXTHDR/OBJ=OBJ$:EXTHDR MSRC$:EXTHDR/UPDATE=(ENH$:EXTHDR)

; Size:           243 code + 0 data bytes
; Run Time:          00:09.1
; Elapsed Time:      00:26.1
; Lines/CPU Min:       3441
; Lexemes/CPU-Min:  15843
; Memory Used:  129 pages
; Compilation Complete
```

0165 AH-BT13A-SE
VAX/VMS V4.0

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